QUALITY ASSURANCE PROJECT PLAN
FOR
PRESUMPTIVE REMOVAL ACTION WORK PLAN

WYLE LABORATORIES
NORTHWEST AREA
1841 Hillside Avenue
Norco, California

Presented to:

Department of Toxic Substances Control
School Evaluation and Clean Up Division
5796 Corporate Avenue
Cypress, California

Prepared by:

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June 10, 2005

Project Title	Quality Assurance Project Plan for Presumptive Removal Action Work Plan
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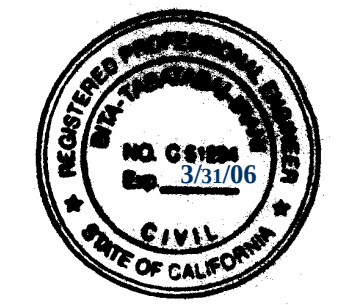

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Devon Rowe	ENVIRON Data Manager

1.0 PROJECT MANAGEMENT/DATA QUALITY OBJECTIVES

1.1 Project Organization/Roles and Responsibilities

The purpose of defining the project organization and the roles and responsibilities of the individuals involved in the project is to provide all involved parties with a clear understanding of the role that each party plays, and to provide the lines of authority and reporting for the project. A project organization chart is provided as Attachment D.1. The organization chart also provides contact information for the parties listed.

Personnel assigned to the project will be required to familiarize themselves with pertinent protocols and procedures presented in this Quality Assurance Project Plan (QAPP). Key project positions relate to project management, data quality management, and field operations management.

Regulatory oversight will be provided by DTSC. The Project Team consists of: Juan Osornio, Shahir Haddad, Ronald Okuda, Kim Foreman, William Bosan, and Theodore Johnson.

Corporate Director- Environmental, Safety & Health, Matthew Letany of Wyle Laboratories is acting Project Manager for Wyle. Wyle's consultant is ENVIRON. ENVIRON personnel working on this project include:

Project Manager, **Carol L. Serlin, R.G.** – The Project Manager is responsible for overall technical and policy decisions involving the project, including interaction and coordination with ENVIRON International Corporation (ENVIRON) project staff, Wyle Laboratories (Wyle), and the lead regulatory agency for the project (California Environmental Protection Agency - Department of Toxic Substances Control [DTSC]).

Project Engineer, **Bita Tabatabai, P.E.** – The Project Engineer is responsible for scope, cost, and technical considerations of the project; staff and project coordination; and implementation and review of overall project quality of the collection, completeness, and presentation of the data.

Technical Peer Review, **George O. Linkletter, Ph.D., R.G**. – The Technical Peer Reviewer is responsible for reviewing technical aspects of the work, including Quality Assurance/Quality Control (QA/QC), strategies, and key reports.

Project Quality Assurance Officer, **Rebekah Wale** – The QA Officer is responsible for reviewing the project QA program as it relates to the collection and completeness of data from field and laboratory operations.

Task (Field) Leaders, **Mauricio H. Escobar, R.G., Safaa Dergham, Brianna Scherffius, Maria Szweminska** – The Task Leaders are responsible for executing the approved work plan, in this case, the Presumptive Removal Action Workplan (RAW) for Soil Vapor at the Northwest area. Task Leaders will work with the Project Manager/Project Engineer and QA Officer to ensure that work is conducted in compliance with project-specific objectives and applicable QA procedures.

Data Management, **Devon Rowe** – The data manager is responsible for management of the database, including updating and maintaining the database as needed, and preparing data tables.

1.2 Problem Definition/Background

1.2.1 Purpose

This QAPP has been prepared by ENVIRON on behalf of Wyle Laboratories, Inc. (Wyle), located at 1841 Hillside Avenue, in the City of Norco, California (Site), to (1) describe the QA/QC procedures that the project team will follow during implementation of the Presumptive RAW for Soil Vapor at the Northwest Area, and (2) assure reporting of data that are representative of field conditions and that are legally defensible.

Guidelines followed in the preparation of this QAPP are described in United States Environmental Protection Agency (USEPA) *Guidance for Quality Assurance Project Plans*, EPA QA/G-5 (USEPA, 2002). Other documents used in preparation of the QAPP include *Guidance for the Data Quality Objectives Process*, EPA QA/G-4 (USEPA, 2000).

1.2.2 Problem Statement

The Site occupies approximately 429 acres of land in Norco, California. The Site was undeveloped until at least 1952; Wyle appears to have first occupied the Site in 1957. Activities performed by Wyle at the Site have historically included testing aerospace components and systems and ordnance and weapons systems. In addition, select areas of the Site have been used for performing environmental and dynamic simulation tests and, infrequently, munitions detonation and solid rocket motor firings. According to Wyle personnel, hydraulic spills occurred historically in several of the test buildings, and trichloroethene (TCE) was used to clean the test equipment. TCE has not been used at the Site since the early 1990s.

Recent and ongoing investigations have indicated the migration of volatile organic compounds (VOC) in ground water from the Site to the Northwest Area. The focus of the Presumptive RAW, and therefore this QAPP, is the residential area at the southern terminus of Golden West Lane (Figure D-1). The primary compounds of concern detected in soil and/or ground water consisted of VOCs, specifically, benzene, TCE, tetrachloroethene (PCE), and one of its degradation products, *cis*-1,2-dichloroethene (*cis*-1,2-DCE). Other contaminants found in ground water at significantly lower concentrations included perchlorate and n-nitroso-dimethylamine (NDMA). VOC-impacted ground water in the Northwest Area will be investigated and addressed, as appropriate, as part of the DTSC Consent Order. The Presumptive RAW was prepared to address VOCs in soil gas at the southern terminus of Golden West Lane in the Northwest Area (Figure D-2).

1.3 Project Description

The objective of the interim remedial measure presented in the Presumptive RAW are to reduce potential exposure to residents via inhalation of indoor air in the Northwest Area.

In order to achieve the objective of the Presumptive RAW, a Soil Vapor Extraction System (SVE) will be installed in the Northwest Area. Soil vapor will be extracted through nine vapor extraction wells located in the Northwest area. Soil gas samples from five existing and six proposed permanent Vapor Probes VW-1 through VW-9 will be collected to evaluate concentrations of VOCs in soil gas (see Figures D-3, Attachments D.2, D.3, and D.4).

1.3.1 Soil Gas Monitoring Activities

Soil gas monitoring activities will include sampling and installing up to six additional vapor probes (VW-6 through VW-11), and sampling the five existing vapor probes (VW-1, through VW-5) at the Northwest Area on a quarterly basis for the 12 months the SVE System is expected to be operational (see Figure D-3, Attachment D.5). After this 12-month period, probes will continue to be monitored quarterly until further investigations, health risk assessments, and/or remediation that is being carried out or planned as part of the DTSC Consent Order for the Site, determines that monitoring is no longer necessary.

1.4 Schedule of Activities

It is anticipated that active soil gas remediation will not be completed through SVE alone. SVE is an interim removal action intended to reduce potential exposure to residents via inhalation of indoor air in the Northwest Area.

As mentioned above, soil gas monitoring will be conducted on a quarterly basis during and after the period when SVE will be implemented.

1.5 Data Quality Objectives

Quality assurance objectives for data generated during the Presumptive RAW are intended to provide guidance for the laboratory analysis of samples to ensure that the data are representative of conditions at the Northwest Area. Specific data quality objectives (DQO) were developed through the DQO process (USEPA, August 2000), to ensure that data collected are of the appropriate type and quality to achieve and support the objectives of the Presumptive RAW; the DQO planning process is included in Attachment D.6. A summary of the identified data needs and uses for this project is provided on Table D-1. Method detection limits and reporting limits for the analytes to be tested are provided on Table D-2.

1.5.1 Measurement Performance Criteria

Performance and acceptance criteria are often expressed in terms of data quality indicators. The principal data quality indicators (DQI) are precision, accuracy, representativeness, comparability, and completeness, defined in the USEPA Guidance document (USEPA, 2002) as:

Precision of the data is the measure of agreement among repeated measurements of the same sample under identical or substantially similar conditions. It is calculated as either the range or as the standard deviation. Precision may also be expressed as a percentage of the mean of measurements, such as relative range or relative standard deviation. The level of effort of precision will be a minimum of 1 in 20 samples analyzed for all analyses that this applies to.

Accuracy of the data is the measure of the overall agreement of a measured value to the true value. It includes a combination of systematic error (bias) and random error (precision) components of sampling and analytical operations. To estimate the accuracy of the data, a selected sample is spiked with a known amount of a standard and is analyzed; the results of which are used to calculate percent recovery. Accuracy measurements will be carried out with a minimum frequency of 1 in 20 samples analyzed for all analyses that this applies to.

Representativeness is a qualitative term used to express the degree to which data accurately and precisely represent a characteristic of a population. Sample collection and handling methods, sample preparation, analytical procedures, holding times, and QA protocols developed for this project, and discussed in the subsequent sections of this document, have been established to ensure that the collected data are representative.

Comparability is a qualitative term used to express the confidence with which one data set can be compared to another data set. Data comparability will be sustained in this project through the use of defined procedures and consistent sampling methods (sample collection and handling, sample preparation, and analytical procedures). Actual detection limits will depend on the sample matrix and will be reported by the laboratory as defined for specific samples.

Completeness is defined as a measure of the amount of valid data to be obtained from the analytical measurement system and the complete implementation of defined field procedures. The target completeness objective for this project is 90%, however the actual completeness may be different, depending on the intrinsic nature of the samples. The data completeness will be evaluated during the data validation review process.

1.6 Specific Training Requirements/Certification

Project staff working at the Northwest Area must meet the applicable Occupational Health and Safety Administration (OSHA) health and safety training requirements for field personnel. Staff records documenting compliance with OSHA requirements are kept on file at ENVIRON. In addition, field staff working at the Northwest Area must comply with project-specific requirements as specified in the project's Health and Safety Plan (HASP) (see Appendix B of the Presumptive RAW).

1.7 Documents and Records

Data measured using field instruments will be recorded on the appropriate field forms. Units of measure for field analyses are identified on the individual field forms. The Project Engineer, or other appropriate person designated by the Project Manager, will review the field data to evaluate the completeness of the field records. Field records will be retained in the project file until completion of the project, after which field records will be retained so as to comply with ENVIRON's document retention policy.

Analytical data will contain the necessary sample results and quality control data to assure compliance with the DQOs defined for the project. All laboratory reports, including chain-of-custody forms, will be retained in the project file.

Work in progress reports and final reports will be kept in the project file. The selection of documents retained in the project file, and the length of time that the documents will remain the project file, will be made in accordance with ENVIRON's document retention policy.

Reports generated as part of the Presumptive RAW implementation will include laboratory reports, chain of custody forms, laboratory QC reports, and data validation reports, as appropriate.

2.0 DATA GENERATION AND ACQUISITION

Sampling process design; sampling methods; sample handling and custody; analytical methods; quality control; instrument/equipment testing, inspection, maintenance, and calibration; inspection/acceptance of supplies; non-direct measurements, and data management are discussed in this section of the document.

2.1 Sampling Process Design

2.1.1 Background

Samples collected as part of the Presumptive RAW will include soil gas samples collected during quarterly monitoring activities currently conducted at the Northwest Area. The collected data will be used to evaluate the effectiveness of SVE in mitigating VOC impacted soil vapor at the southern terminus of Golden West Lane in the Northwest Area.

2.1.2 Rationale for Sampling Design

Rationale for choosing the sampling locations, number of samples, and laboratory analysis are described in the following sections of this document.

2.1.3 Soil Gas Monitoring

Soil gas samples will be collected on a quarterly basis to (1) assess the effectiveness of SVE in mitigating TCE in soil gas at the southern terminus of Golden West Lane in the Northwest Area, and (2) comply with the SCAQMD permit. Data generated during sampling will be evaluated for possible optimization of the SVE system, if needed.

2.1.3.1 Number of Samples

Quarterly soil gas monitoring has been conducted at the Northwest Area as part of the Site Boundary Plan since 2004. The existing soil gas monitoring network is comprised of five permanent vapor probes in the Northwest Area. Additionally six vapor probes will be installed as part of the Presumptive Raw. Vapor Probes will continue to be used for soil gas monitoring activities during implementation of the Presumptive RAW. Soil gas samples will be obtained from all 11 permanent vapor probes during quarterly events. In addition, field QA samples, consistent with current sampling techniques, will be collected

2.1.3.2 Laboratory Analysis

The collected samples will be sent under standard chain-of-custody protocols to a California-certified laboratory for analysis. Soil gas samples will be analyzed for VOCs by USEPA Method TO-15. Analytical methods and sample collection requirements for soil gas samples are provided in Table D-3.

It is anticipated that chemical analysis will be performed by Del Mar Analytical (Del Mar) of Irvine, California. Del Mar is certified by the California Department of Health Services pursuant to the provisions of the California Environmental Laboratory Improvement Act of 1988. Del Mar may also subcontract analyses to other certified laboratories.

2.2 Sampling Methods

Sample media that will be collected during implementation of the Presumptive RAW includes soil gas samples. Vapor samples will be collected from the vapor probes using SUMMA® canisters and sent to a laboratory for analysis in accordance with appropriate COC procedures, for chemical analysis of VOCs (Attachment D.5).

2.3 Sample Handling and Custody Requirements

Samples will be placed in closed cooled containers. Field documents will include daily field log forms, sample custody seals, COC records, and photographs. The Task Leader in the field is personally responsible for the care and custody of the samples collected from the time they are collected until they are transferred or dispatched to the laboratory. In this process, a COC record

accompanies the samples. When transferring samples, the individuals relinquishing and receiving the sample(s) sign, date, and note the time on the record. This record documents custody transfer from the sampler, often through another person (i.e., a laboratory courier), to the sample receiving department at the laboratory. Samples will be delivered to the laboratory within 24 hours of collection. Samples will ultimately be disposed of by the analytical laboratory (Attachments D.5, D.6, and D.7).

2.4 Analytical Methods

Analytical methods, including method detection limits and reporting limits, to be used during implementation of the Presumptive RAW are listed on Tables D-2 and D-3. Del Mar standard operating procedures (SOPs) for the listed methods are presented in Attachment D.7.

2.5 Quality Control Requirements

2.5.1 Field QC Procedures

QC samples collected in the field will consist of field duplicates and laboratory QC samples (for matrix spike [MS] and matrix spike duplicates [MSDs].

The field duplicate is an independent sample collected as close as possible to the same time that the primary sample is collected and from the same source, and is used to document sample precision. Field duplicates will be labeled and packaged in the same manner as primary samples so that the laboratory cannot distinguish between the primary sample and the duplicate sample. Field duplicates will be collected at a frequency of one in every 10 samples, or a minimum of one per sampling event, and will be analyzed for the same suite of parameters as the primary sample.

MS/MSD samples will be collected to check for precision and accuracy of the laboratory analytical results. The MS portion of the sample is an aliquot of a sample that is spiked (by the laboratory) with a known concentration of the target analyte(s) and provides a measure of the method accuracy. The MSD portion of the sample is a laboratory split sample of the MS and is used to determine the precision of the analysis. The MS/MSD samples will be identified as such when submitted to the laboratory. A minimum of one MS/MSD sample will be collected for every 20 samples collected, or a minimum of one per sampling event.

2.5.2 Laboratory QC Procedures

Laboratory QC samples and procedures will include the following:

- MS/MSD samples will be analyzed at a minimum of one per 20 project samples
- Method blanks will be prepared and analyzed at least once with each analytical batch, with a minimum of one for every 20 samples
- Laboratory control samples will be prepared and analyzed at least once with each analytical batch, with a minimum of one for every 20 samples.
- Blanks, QC samples, and project samples will be spiked with surrogate compounds if specified in applicable analytical method. Surrogate recoveries are expected to be within the range set by the laboratory in accordance with procedures specified in the method.

2.5.3 Corrective Actions

Corrective actions may be initiated if precision or accuracy goals are not achieved. The initial step in corrective action will be to instruct the laboratory to examine its procedures to assess whether analytical or computational errors caused the anomalous results. At the same time, sample collection and handling procedures will be reviewed to assess whether they could have contributed to the anomalous results. Based on this evaluation, the Project Manager or Project Engineer, together with the Project QA Officer, will assess whether re-analysis or resampling is required or whether any protocol should be modified for future sampling events. Any changes in laboratory methods, or quality assurance parameters or limits, require written approval by ENVIRON prior to implementation by the laboratory.

2.6 Instrument/Equipment Testing, Inspection, and Maintenance

2.6.1 Field Instrumentation

Field equipment used in the collection of soil gas samples will be maintained according to the manufacturer's specifications, and will be inspected prior to use.

2.6.2 Laboratory Equipment

Instrument maintenance logbooks are maintained in the laboratory. In general, the logbooks contain a schedule of maintenance, as well as a complete history of past maintenance, both routine and non-routine, for that particular instrument.

Preventive maintenance is performed according to the procedures specified in the manufacturer's instrument manuals, including lubrication, source cleaning, and detector cleaning, and the frequency of such maintenance. Chromatographic carrier gas purification traps, injector liners, and injector septa are cleaned or replaced on a regular basis. Precision and accuracy data are examined for trends and excursion beyond control limits to determine evidence of instrument malfunction. Maintenance will be performed when an instrument begins to degrade as evidenced by the degradation of peak resolution, shift in calibration curves, decrease in sensitivity, or failure to meet one or another of the pre-determined QC criteria.

2.7 Instrument Calibration and Frequency

2.7.1 Field Calibration Procedures

For soil gas sampling activities, field equipment requiring calibration will include the Horriba PID; which will be calibrated according to the manufacturer's recommendations but will be calibrated, at a minimum, at the beginning of each day (prior to first use). Calibration measurements will be recorded on the Calibration Log Form.

2.7.2 Laboratory Calibration Procedures

Laboratory calibration procedures are described in the method-specific SOPs attached in Attachment D.7.

2.8 Inspection/Acceptance of Supplies and Consumables

Task (Field) Leaders will be responsible for ordering and maintaining supplies, as needed. Task Leaders will inventory critical supplies on a regular basis to ensure that work will not be delayed unnecessarily.

2.9 Non-direct Measurements

Previous sampling activities conducted at the Northwest Area have resulted in a database of soil gas data; such historical data will continue to be used in the decision-making processes for this project. In addition, information obtained during monitoring activities at the Northwest Area will be combined with the historical data to evaluate the effectiveness of the SVE in mitigating the concentration of VOCs in the subsurface.

2.10 Data Management

Soil gas sampling data will be provided to ENVIRON by the laboratory in both hard copy and electronic formats. Data generated during performance of the Presumptive RAW will undergo two levels of review and validation, one at the laboratory, and one after the data have been received by ENVIRON (as described in Section 4.0). After data validation is completed, the data will be entered into a databases created for the Northwest Area to facilitate data compilation and report preparation. Data tables will be prepared from the database. Original hard copy laboratory reports will be retained in the project file.

3.0 ASSESSMENT AND OVERSIGHT

Assessments and evaluations are designed to determine whether the QAPP is being implemented as approved, to increase confidence in the information obtained, and ultimately, to determine whether the information may be used for its intended purpose(s).

3.1 Assessment and Response Actions

During the performance of the Presumptive RAW, the Project Manager, the Project Engineer, the Project QA Officer, or other person designated by the Project Manager, will perform periodic assessments of compliance with the QAPP. When problems or issues are identified, the Task Leader(s) will be notified of the issue and instructed as to how to proceed going forward. If a subsequent assessment reveals that the problem has not been corrected, a field audit will be conducted. In addition, periodic unannounced QC audits may be conducted of field operations. Such QC audits may include evaluation of the following actions: field procedures, sampling activities, field notes, chain-of-custody procedures, field measurements, field equipment calibration procedures, and sample packaging and shipment.

The laboratory will be responsible for its own compliance with the QAPP. During the data validation process, ENVIRON will review selected elements of the laboratory's performance as it relates to the QAPP. If non-compliance issues are identified, the laboratory will be notified as to what issue(s) has been identified and will be required to prepare a written response to ENVIRON regarding what corrective action will be taken to address the issue. If non-compliance problems persist, audits and/or performance evaluation sampling may be implemented.

3.2 Reports to Management

The Project Manager/Project Engineer and the Task Leader(s) will meet on a regular basis to discuss progress on the project, and resolve any issues or problems to be corrected. In addition, the Task Leader(s) will notify the Project Manager/Project Engineer immediately of any changes to the scope of work or the analytical program that could potentially impact the usability of the data collected.

4.0 DATA VALIDATION AND USABILITY

4.1 Data Review, Validation, and Verification Requirements

As indicated previously, data generated during performance of the Presumptive RAW will undergo two levels of review and validation, one at the laboratory, and a second review after the data are received by ENVIRON. The second data validation review will be performed by ENVIRON's designated independent QA/QC officer, or by a third party. Data validation procedures performed by ENVIRON or the third party reviewer for the soil gas data will be performed at the following level of effort:

- 80% of the analytical data (in batches) will be reviewed for all analytical parameters, detections, and non-detections at Level 3, as defined by the USEPA in *Contract Laboratory Program National Functional Guidelines* (1999 and 2002a).

- 20% of the analytical data (in batches) will be reviewed for all parameters, detections, and non-detections at Level 4, as defined by USEPA.

Data validation for the SVE system in compliance with the SCAQMD permit will undergo Level 2 data validation.

4.2 Validation and Verification Methods

Initial data reduction, validation, and reporting will be performed by the laboratory as described in the laboratory SOPs (Attachment D.6).

Data validated outside the laboratory will be reviewed at the level of effort described in the USEPA CLP National Functional Guidelines (1999 and 2002a). If necessary, and as appropriate, the QA Officer may determine that more than 20% of the analytical data will undergo Level 4 data validation; however, no less than 20% of the data will undergo Level 4 data validation for each sampling event.

4.3 Reconciliation with Data Quality Objectives

Analytical results obtained from the project will be reconciled with the requirements specified in this QAPP. Data validation and usability includes the final project checks to evaluate if the data obtained will conform to the project's objectives, and to estimate what the effect is if the deviations occur. Assessment of data for precision, accuracy, and completeness will be performed according to the following quantitative definitions.

4.3.1 Precision

If calculated from duplicate measurements:

$$RPD = \frac{(C_1 - C_2) * 100\%}{(C_1 + C_2)/2}$$

where:

RPD	=	relative percent difference
C_1	=	larger of the two observed values
C_2	=	smaller of the two observed values

If calculated from three or more replicates, use relative standard (RSD) rather than RFD:

$$RSD = \left(s/\bar{y}\right)100\%$$

RPD	=	relative standard deviation
s	=	standard deviation
$\bar{y}$	=	mean of replicate analyses

Standard deviation is defined as follows:

$$s = \sqrt{\sum_{i=1}^{n} \frac{(y_i / y)^{-2}}{n-1}}$$

s	=	standard deviation
y_i	=	measured value of the i^{th} replicate
y	=	mean of replicate analyses

n = number of replicates

4.3.2 Accuracy

For measurements where matrix spikes are used:

$$\%R = 100\%\left[\begin{matrix} S - & U \\ C_{sa} & \end{matrix}\right]$$

$\%R$ = percent recovery
S = measured concentration in spiked aliquot
U = measured concentration in unspiked aliquot
C_{sa} = actual concentration of spike added

For situation where a standard reference material (SRM) is used instead of or in addition to matrix spike:

$$\%R = 100\%\left[\frac{C_m}{C_{sm}}\right]$$

$\%R$ = percent recovery
C_m = measured concentration of SRM
C_{sm} = actual concentration of SRM

4.3.3 Completeness (Statistical)

Defined as follows for all measurements:

$$\%C = 100\%\left[\frac{V}{T}\right]$$

$\%C$ = percent completeness
V = number of measurements judged valid
T = total number of measurements

5.0 REFERENCES

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